

1970

OPERATING SUMMARY

LABORATORY LIBRARY
ONTARIO WATER RESOURCES COMMISSION

LIBRARY COPY

JAN 21 1972

ONTARIO WATER
RESOURCES COMMISSION

GEORGETOWN

water pollution control plant

TD227
G46
W38
1970
MOE

c.1
a aa

ONTARIO WATER RESOURCES COMMISSION

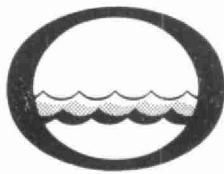
Division of Plant Operations

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca



Water management in Ontario

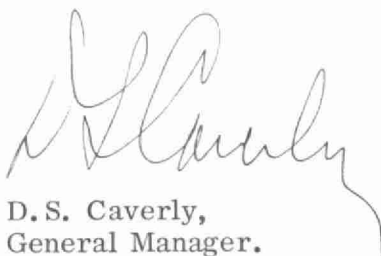
Ontario
Water Resources
Commission


135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.


D.S. Caverly,
General Manager.


D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

CONTENTS

Title page.	1
Flow diagram	2
Design data	3
'70 Review	4
Project costs	6
Process data	10



Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
Canada

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN
D. J. Collins

VICE-CHAIRMAN
J. H. H. Root, M. P. P.

COMMISSIONERS
H. E. Brown
F. S. Hollingsworth
Dr. C. A. Martin
D. A. Moodie
L. E. Venchiarutti

GENERAL MANAGER
D. S. Caverly

ASSISTANT GENERAL MANAGERS
K. H. Sharpe
F. A. Voegel
A. K. Watt

COMMISSION SECRETARY
W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

Director
D. A. McTavish

Assistant Director
C. W. Perry

Regional Supervisor
A. C. Beattie

Operations Engineer
B. W. Hunsler

133 St. Clair Avenue West
Toronto 190

GEORGETOWN
water pollution control plant

operated for

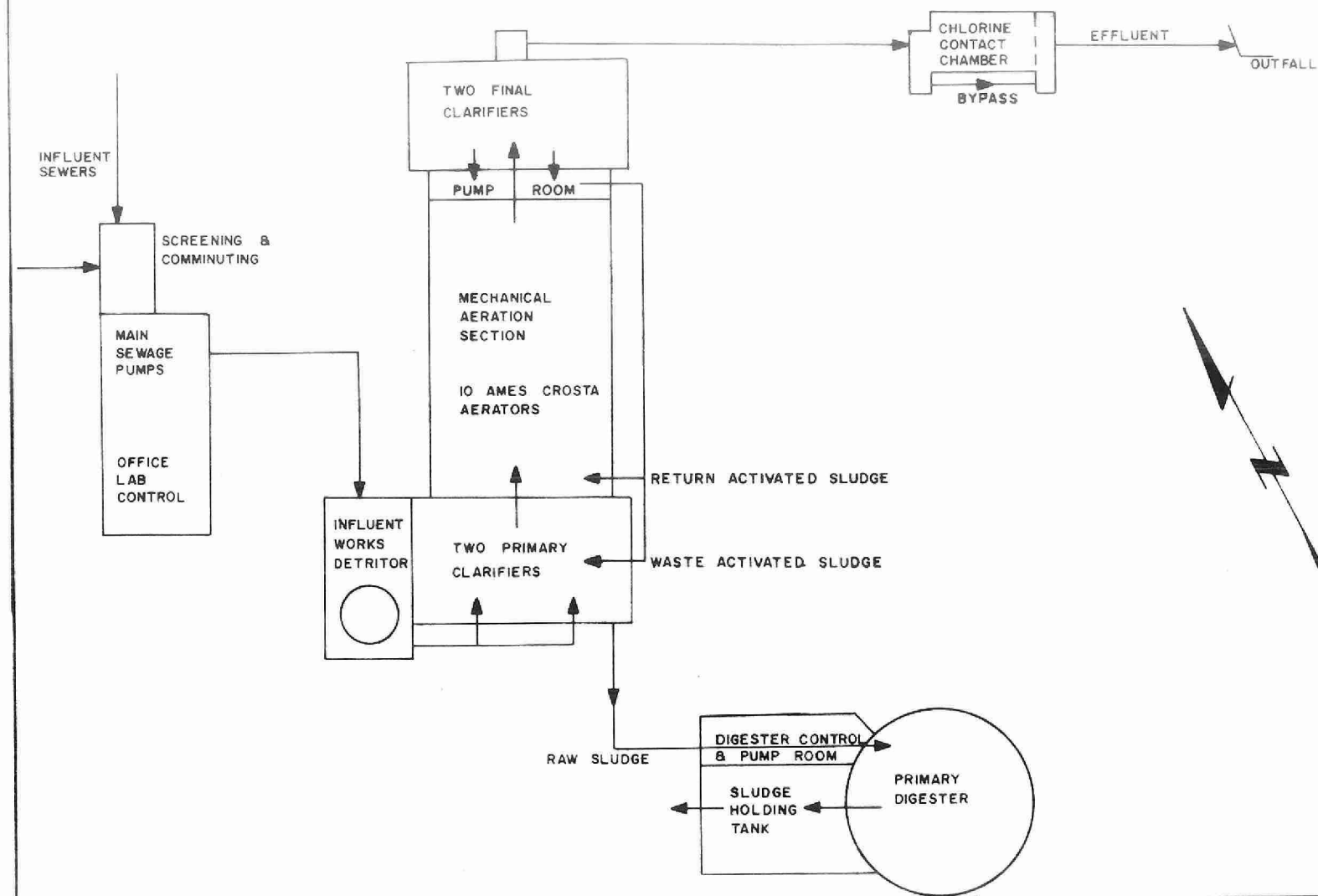
THE TOWN OF GEORGETOWN

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY

GEORGETOWN WPCP
FLOW DIAGRAM



DESIGN DATA

PROJECT NO.	2-0017-58	TREATMENT	Activated Sludge
DESIGN FLOW	1.50 mgd	DESIGN POPULATION	15,000
BOD - Raw Sewage - Removal	200 mg/l 95%	SS - Raw Sewage - Removal	200 mg/l 95%

PRIMARY TREATMENT

Screening

Type: Manually cleaned bar screen
Size: 3/4" spacing

Comminution

Type: C. P. Barminutor
Size: One Model C (24")

Sewage Lift Pumps

Type: Chicago Pump
Size: Two 2,900 gpm @ 60' tdh

Grit Removal

Type: Dorr Type WA Detritor
Size: One 12' x 12' x 1' 3" (1,120 gal)
Retention: 1.1 min

Primary Sedimentation

Type: Dorr Type A
Size: Two 35' x 35' x 10' swd
(24,500 cu ft or 153,000 gal)
Retention: 2.5 hours
Loading: Surface, 612 gal/ft²/day
Weir, 5,360 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration; single-pass
Size: Two 112' x 28' x 13.25' (79,400 cu ft or 0.495 mil gal)
Retention: 7.9 hours

Aerators

- Eight Ames-Crosta

Secondary Sedimentation

Type: Dorr Type AZ
Size: Two 40' x 40' x 10' swd (32,000 cu ft or 200,000 gal)
Retention: 3.2 hours
Loading: Surface, 470 gal/ft²/day
Weir, 4,700 gal/ft/day

CHLORINATION

- One W & T 200 lb/day

Chlorine Contact Chamber

Size: One 45' x 15' x 6' deep (27,000 gal)
Retention: 26 min

OUTFALL

- to Silver Creek

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --

Type: Dorr draft tube mixers (3) on fixed steel roof
Size: One 66' dia x 22.6' (avg) (77,800 cu ft or 485,000 gal)
Loading: 1.1 lb/cu ft/mo

Secondary --

Size: One 34' x 34' x 16.25' (20,700 cu ft or 129,000 gal)
Total Loading: 0.87 lb/cu ft/mo

'70 REVIEW

GENERAL

The Georgetown Water Pollution Control Plant is a 1.5 million gallon per day plant providing conventional secondary treatment, final effluent chlorination and sludge digestion. The project is staffed by 3 operators.

Under the supervision of head office engineers the plant staff operated a clean, attractive and efficient plant for the Town of Georgetown.

EXPENDITURES

In 1970, a total of 596.7 million gallons was treated at an operating cost of \$49,195.43. The unit cost of operation was \$82.45 per million gallons of sewage or 9 cents per pound of BOD removed.

PLANT EXPANSION

Because of the approaching hydraulic overload, Proctor and Redfern Ltd., Consulting Engineers were instructed in December 1968 to prepare a preliminary report on the enlargement of the Georgetown Water Pollution Control plant. The report was completed in June 1969 and was followed by a supplementary report completed in January 1970.

The reports recommended that the plant capacity be expanded from 1.5 mgd to 3.0 mgd. All units in the present plant are to be duplicated with the exception of the aeration section and the primary digester system which do not require enlargement in this stage of expansion. It was recommended that effluent polishing facilities using an automatic backwash filter be provided rather than extending an outfall sewer from the plant to the Credit River. It was also recommended that the existing access road be improved at the time of expansion.

PLANT FLOWS and CHLORINATION

Daily flows averaged 1.61 million gallons and exceeded the design flow of 1.5 mgd 76% of the time during the year. The flows increased by 7% over 1969 during which time the design value was exceeded 35% of the time.

A total of 14,300 pounds of chlorine was required to maintain an average chlorine residual of 0.5 mg/l in the final effluent.

PLANT EFFICIENCY

The average raw sewage BOD was 117 mg/l which was 42% less than the design value of 200 mg/l. The 1970 average raw sewage BOD was 50% greater than the 1969 average of 78 mg/l. This increase reflects the addition of new sewers and renovations to the existing sewer system in the Town of Georgetown. The effluent BOD averaged 21 mg/l, exceeding the OWRC effluent BOD objective of 15 mg/l 85% of the time. The average BOD removal efficiency was 82%.

The average raw sewage suspended solids concentration of 248 mg/l was 24% greater than the design value of 200 mg/l. The average 1970 raw sewage suspended solids concentration was 45% greater than the 1969 average raw sewage suspended solids concentration of 137 mg/l. This increase in suspended solids concentration also reflects improvements in the sewer system. The raw sewage design value of 200 mg/l was exceeded 24% of the time. The average suspended solids in the effluent was 17 mg/l. The OWRC effluent suspended solids objective of 15 mg/l was exceeded 50% of the time.

SLUDGE DIGESTION and DISPOSAL

The digester was out of operation for repairs to prevent gas leakage. Before repairs could be undertaken, it was first necessary to remove all sludge from the digester. Extreme difficulties were encountered in disposing of raw sludge during the digester cleanout. Local public health and provincial regulatory authorities carefully monitored the sludge disposal program. At the end of the year all raw sludge had not been removed from the primary digester. However it was anticipated that the digester will be empty early in 1971 and the necessary repairs then completed.

A total of 6208 cubic yards of raw sludge was removed from the plant by tank truck.

CONCLUSIONS

While renovations of the existing sewer system has reduced infiltration, no reduction in flows to the plant can be anticipated because of the extensions to the sewer system.

The effect of hydraulic overloading is reflected in a reduction in plant efficiency. Plant expansion procedures which have started should be expedited.

PROJECT COSTS

2-0017-58 NET CAPITAL COST (Final)	\$871,677.01
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>48,379.33</u>
Long Term Debt to OWRC	<u>\$823,297.68</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	<u>\$221,224.13</u>
Net Operating	\$ 49,195.43
Debt Retirement	16,614.00
Reserve	4,507.11
Interest Charged	<u>46,126.26</u>
TOTAL	<u>\$116,442.80</u>

RESERVE ACCOUNT

Balance @ January 1, 1970	\$ 44,556.41
Deposited by Municipality	4,507.11
Interest Earned	<u>2,868.90</u>
	\$ 51,932.42
Less Expenditures	<u>1,978.69</u>
Balance @ December 31, 1970	<u>\$ 49,953.73</u>

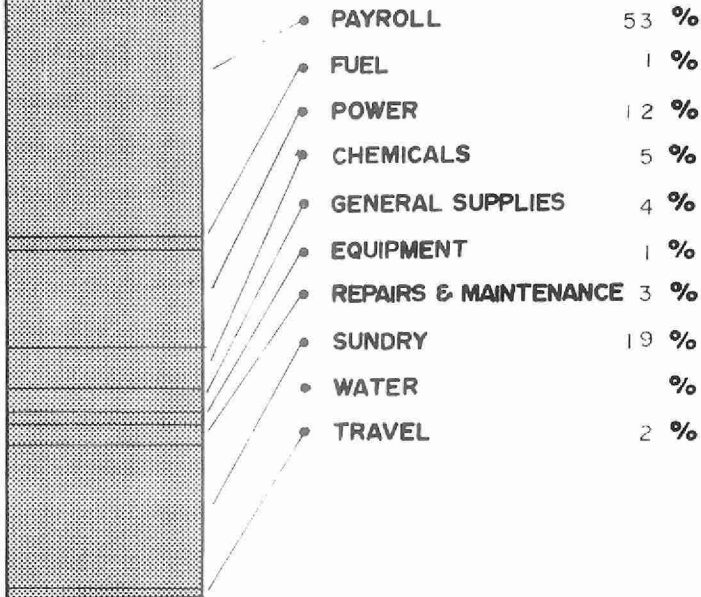
PROJECT COSTS

2-0077-61	
NET CAPITAL COST (Final)	\$63,230.31
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>19,072.10</u>
Long Term Debt to OWRC	<u>\$44,158.21</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	\$ <u>9,294.88</u>
Net Operating	\$ -
Debt Retirement	891.00
Reserve	276.86
Interest Charged	<u>2,474.02</u>
TOTAL	\$ <u>3,641.88</u>

RESERVE ACCOUNT

Balance @ January 1, 1970	\$ 3,640.82
Deposited by Municipality	276.86
Interest Earned	<u>241.54</u>
	\$ 4,159.22
Less Expenditures	<u>-</u>
Balance @ December 31, 1970	\$ <u>4,159.22</u>

1970 OPERATING COSTS



TOTAL ANNUAL COST

NET OPERATING	42 %
DEBT RETIREMENT	14 %
INTEREST	40 %
RESERVE FUND	4 %

Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	363.47	\$34,306.82	\$105.39	15 cents
1967	650.11	42,383.25	65.19	9 cents
1968	539.42	43,308.19	80.29	11 cents
1969	477.8	48,582.44	101.68	16 cents
1970	596.7	49,195.43	82.45	9 cents

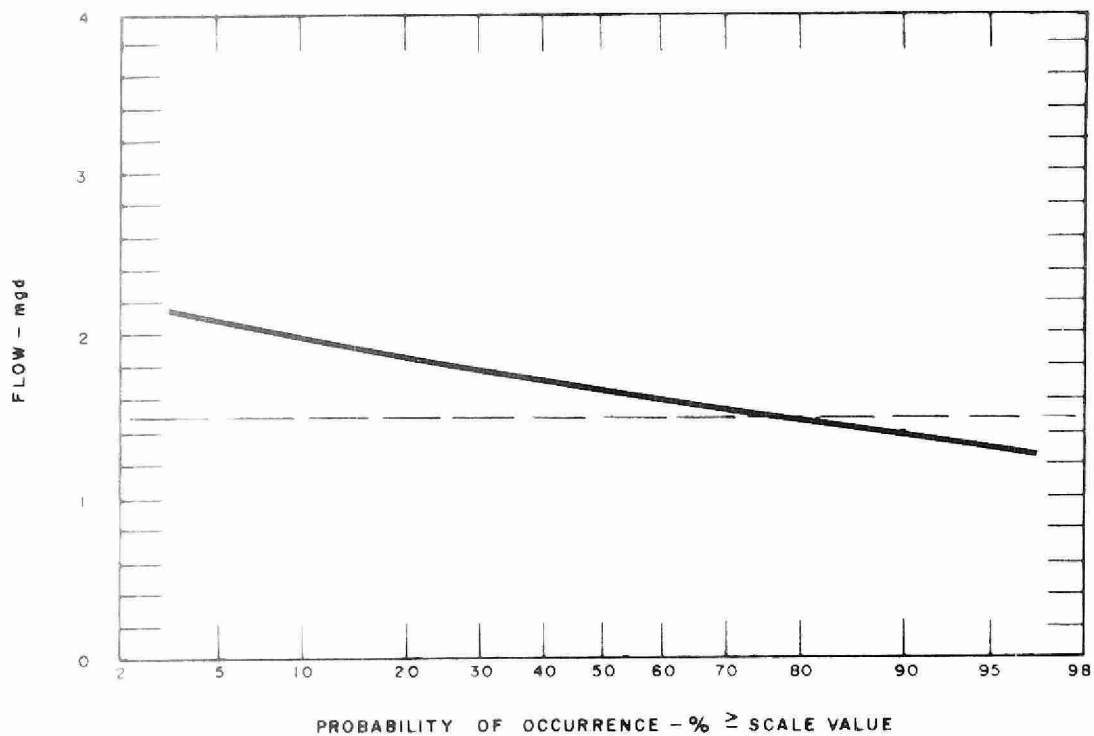
MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	4854.19	2656.25	-	54.73	-	286.65	67.40	-	-	1789.16	-	-
FEB	3279.10	1900.73	-	90.00	568.80	-	59.32	-	39.00	556.90	-	64.35
MAR	3312.09	1975.57	-	-	582.41	220.50	85.73	196.40	162.55	25.93	-	63.00
APR	3668.69	1892.14	-	76.61	491.24	(66.15)	137.29	82.22	-	944.49	-	110.85
MAY	3505.88	2085.97	-	55.80	519.14	290.59	307.82	50.68	-	102.28	-	93.60
JUNE	3145.53	1929.29	378.60	70.35	500.47	-	19.71	-	-	148.36	-	98.75
JULY	6762.96	1828.09	344.30	-	894.68	581.18	320.85	-	197.50	2518.21	-	78.15
AUG	5107.50	2776.10	490.41	37.58	-	-	151.18	-	371.42	1156.31	-	124.50
SEPT	3932.77	1864.97	25.03	-	463.33	232.48	91.54	-	29.70	1150.42	-	75.30
OCT	3581.02	1842.20	50.48	-	863.01	348.71	167.26	-	204.61	31.10	-	73.65
NOV	2857.79	2076.00	12.50	57.02	-	290.59	97.44	55.56	242.58	26.10	-	-
DEC	5187.91	1828.60	-	96.10	1102.28	304.78	245.96	-	406.92	916.52	-	286.75
TOTAL	49195.43	24655.91	1301.32	538.19	5985.36	2489.33	1751.50	384.86	1654.28	9365.78	-	1068.90

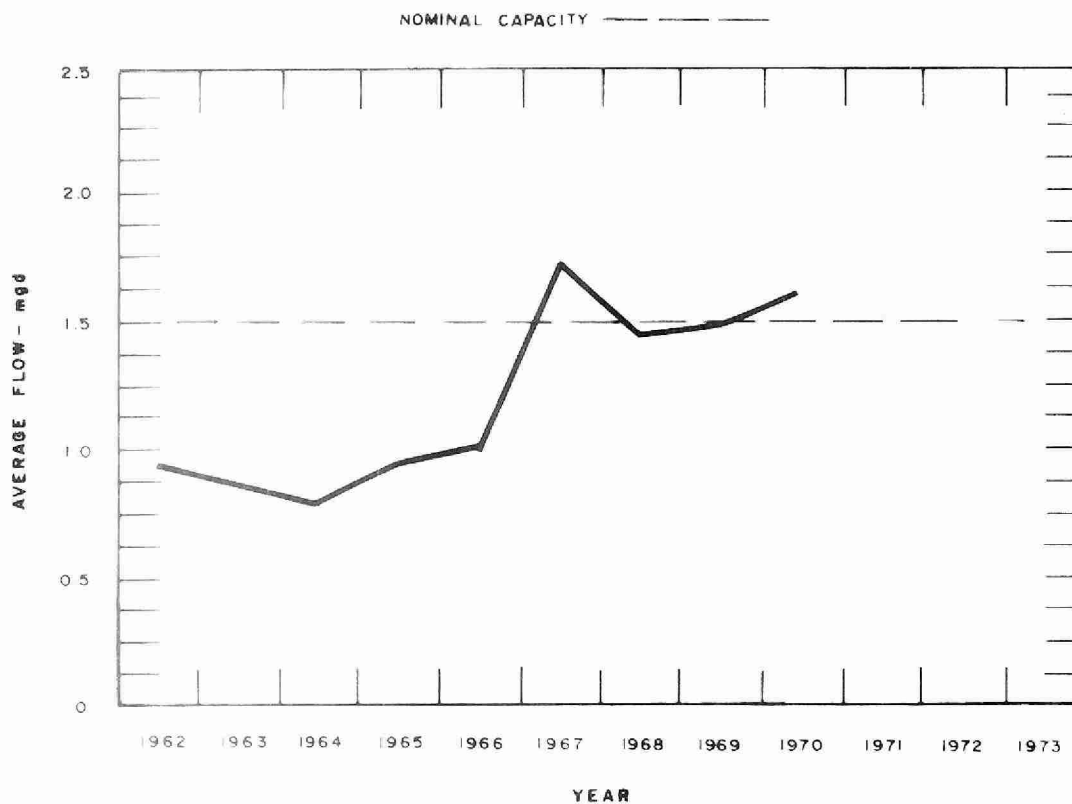
BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE \$7942.69

PROCESS DATA

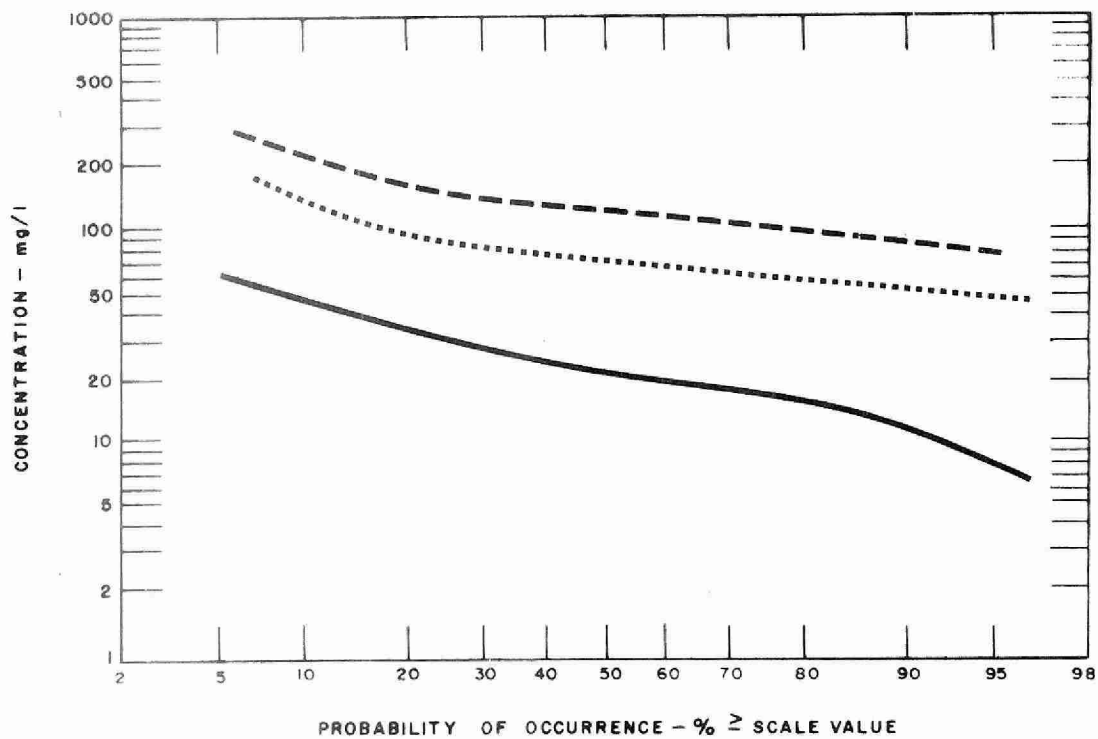


FLOWS

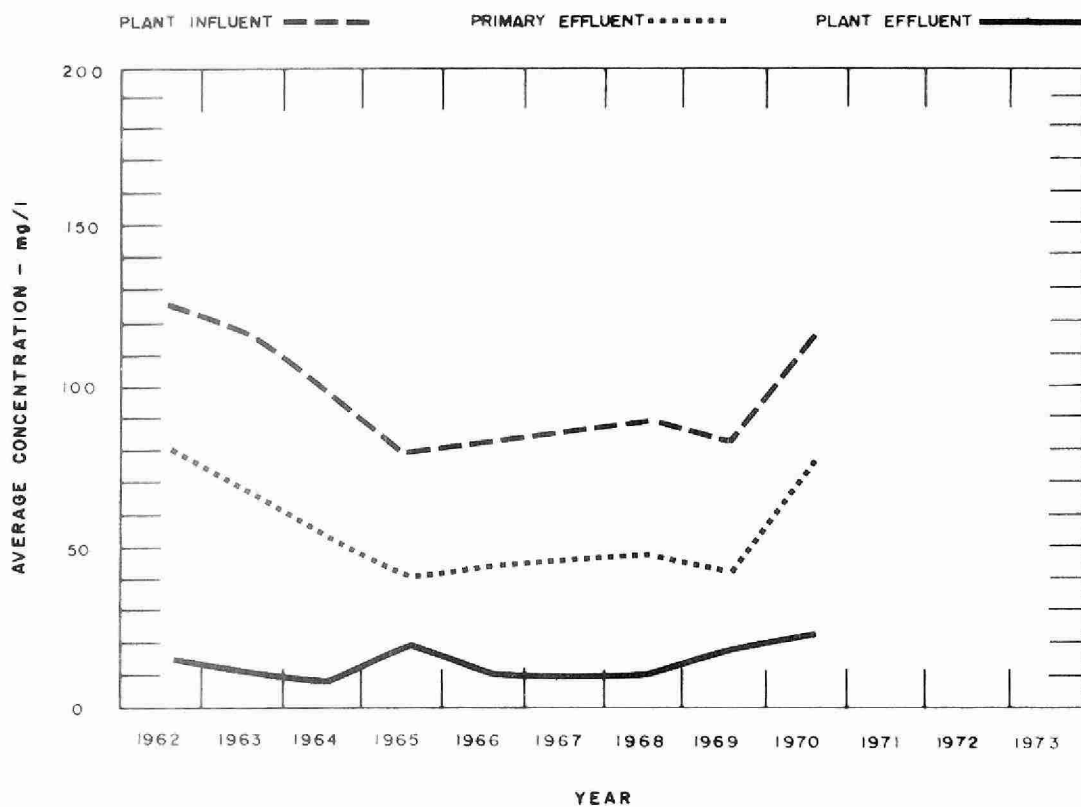


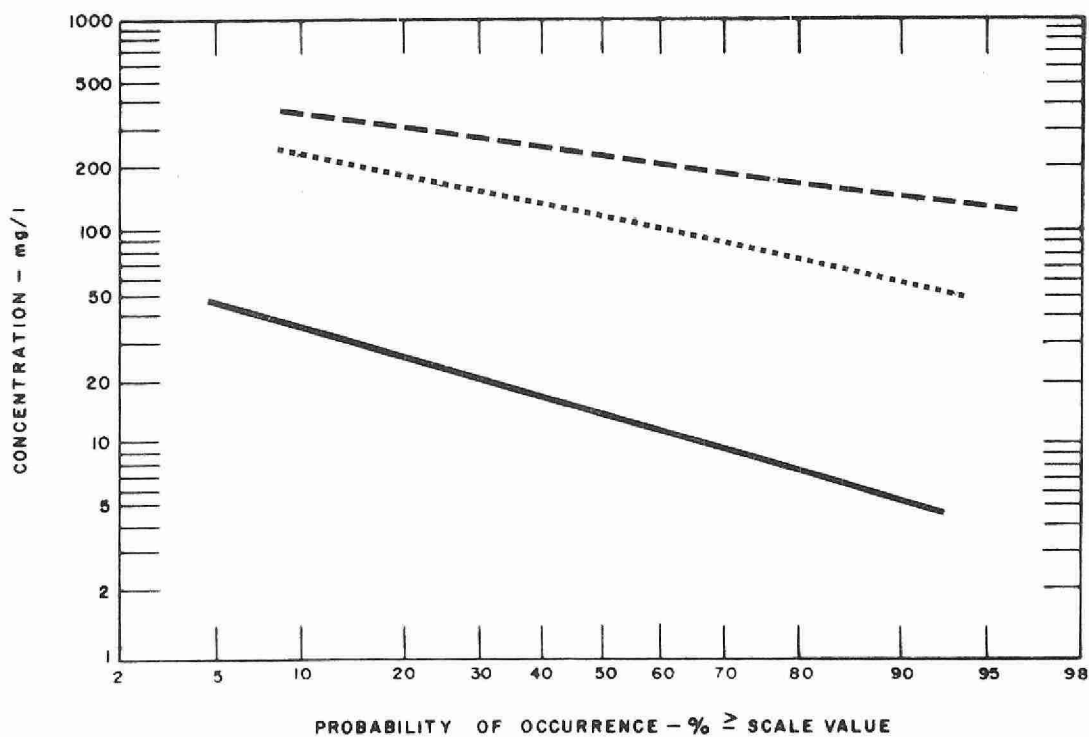
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10 ³ pounds	DOSAGE mg/l
JAN	42.8	1.38	1.9	1.2	1.3	3.1
FEB	39.6	1.41	1.6	1.3	1.0	2.6
MAR	57.5	1.85	2.2	1.4	1.2	2.0
APR	56.0	1.87	2.2	1.5	1.1	1.9
MAY	54.7	1.77	2.2	.9	1.1	2.0
JUNE	57.3	1.64	2.1	1.4	1.1	1.9
JULY	48.0	1.52	2.6	1.3	1.2	2.5
AUG	46.4	1.48	1.8	1.3	1.1	2.4
SEPT	47.3	1.56	2.2	1.2	1.2	2.4
OCT	47.1	1.53	2.2	1.2	1.3	2.7
NOV	47.8	1.63	2.0	1.4	1.3	2.7
DEC	52.3	1.66	2.2	1.4	1.4	2.7
TOTAL	596.7	-	-	-	1.43	-
AVERAGE	-	1.61	MAX 2.6	MIN .9	-	2.4

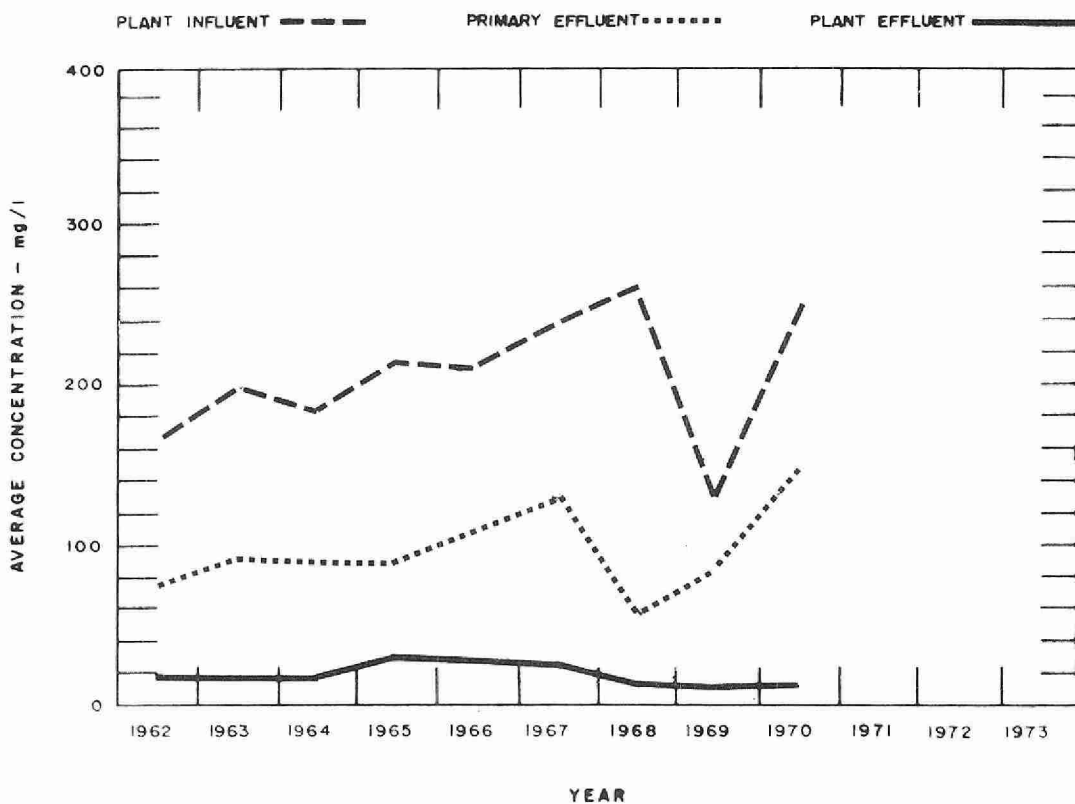


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



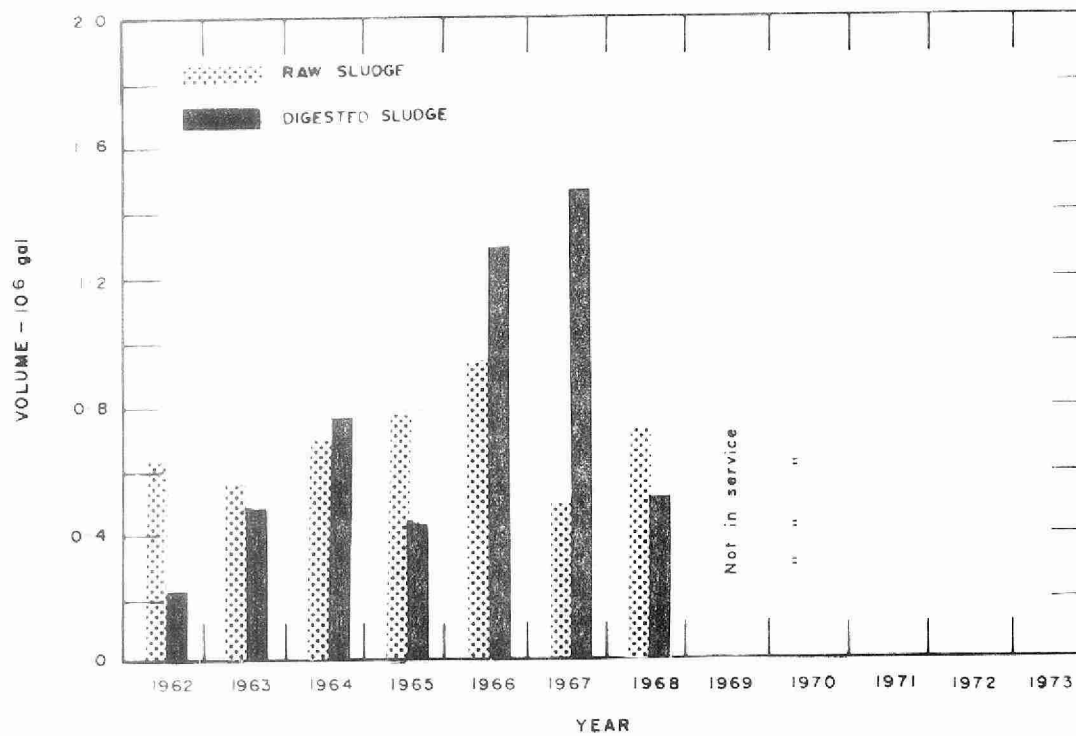
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED cu ft
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10 ³ pounds	n	mg/l	n	mg/l	%	10 ³ pounds	
JAN	5	102	5	34	67	29	7	245	5	51	79	83	19
FEB	4	86	4	12	47	29	9	165	7	15	59	59	10
MAR	5	142	5	11	92	75	10	197	10	8	96	109	25
APR	2	78	2	11	86	38	6	226	6	15	93	118	53
MAY	2	155	2	21	86	73	7	288	7	19	93	147	57
JUNE	1	130	2	48	63	47	9	345	8	22	94	185	88
JULY	2	85	2	16	81	33	6	265	6	13	95	121	83
AUG	2	95	2	19	80	35	6	255	6	11	96	113	53
SEPT	2	178	2	15	92	77	5	263	5	12	95	119	93
OCT	1	110	1	44	60	31	5	231	5	23	90	98	59
NOV	3	129	2	19	85	53	5	191	5	8	96	88	39
DEC	1	140	1	18	87	64	4	346	4	19	95	17	23
TOTAL	30	-	30	-	-	584	79	-	74	-	-	1257	602
AVERAGE	-	117	-	21	82	-	-	248	-	17	93	-	-

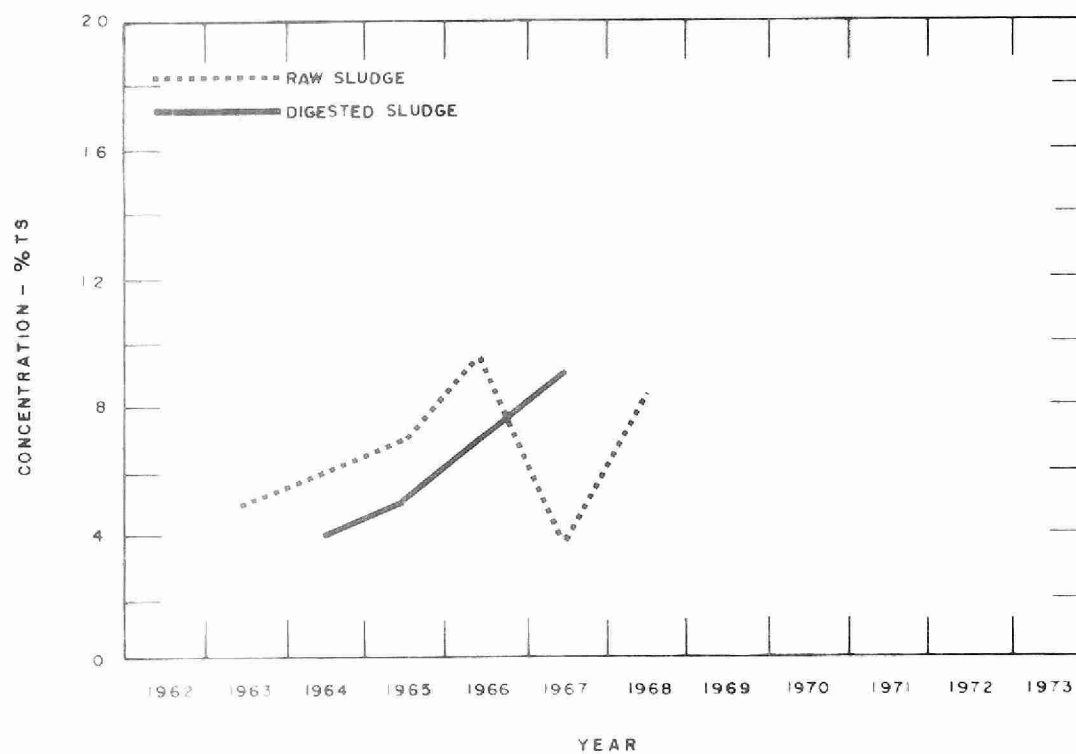
NOTE - n is the number of samples taken

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD lb MLSS	AIR USED 1000 cu ft lb BOD	WASTE SLUDGE lb/DAY
		BOD	SS	BOD	SS				
		mg/l	mg/l	mg/l	mg/l				
JAN	1.4	60	124	34	51	890	.22		
FEB	1.4	63	107	12	15	3360	.06		
MAR	1.8	76	86	11	8	1670	.16		
APR	1.9	68	140	11	15	1240	.20		
MAY	1.8	95	272	21	19	1780	.18		
JUNE	1.6	70	204	48	22	2130	.01		
JULY	1.5	97	121	16	13	2300	-		
AUG	1.5	48	93	19	11	1000	-		
SEPT	1.6	50	116	15	12	1010	.15		
OCT	1.5	101	136	44	23	1260	.24		
NOV	1.6	105	134	19	8	1380	.31		
DEC	1.7	95	163	18	19	1310	.23		
TOTAL	-	-	-	-	-	-	-		
AVERAGE	1.6	77	141	21	17	1610	.18		



DIGESTION

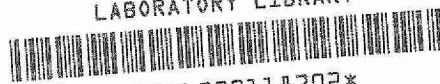


SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	DEWATERED	LIQUID
	10 gal	%	%	10 gal	%	%	10 gal	%	cu yd	cu yd
JAN		7.0	65							490
FEB		7.5	65							816
MAR		6.1	62							28
APR		9.1	58							378
MAY		9.3	55							931
JUNE		8.8	52							700
JULY		7.0	50							956
AUG		6.6	53							903
SEPT		5.2	58							413
OCT		7.6	55							0
NOV		5.3	64							151
DEC		4.5	62							442
TOTAL										6208
AVERAGE		7.0	58							

Note: Digester out of service

LABORATORY LIBRARY



96936000118702

Date Due

TD227/G46/W38/1970/MOE
Ontario Water Resources Co
Georgetown water
pollution control plant! asxp
1970 operating c.1 a aa
summary



Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
Canada



Water management in Ontario